

WHAT IS CLAIMED IS:

1. A time-of-flight mass spectrometer reflector, comprising:

a single piece reflector body with a radially symmetrical trough.

2. A reflector in accordance with claim 1, wherein said reflector body is made of a

5 stainless steel with an inner side of said trough being polished.

3. A reflector in accordance with claim 1, wherein said reflector body is formed of a carrier material with a conductive coating with an inner side of said trough being polished.

4. A reflector in accordance with claim 1, wherein a diameter of said reflector body measured at the edge of said trough, is between 60 mm and 75 mm.

10 5. A time-of-flight mass spectrometer, comprising:

a housing, into which molecules of a gas to be analyzed enter;

an ion source, by which the molecules present in the housing are ionized;

an annular electrode to which a certain voltage potential is applied, and by which the ionized molecules are accelerated;

15 a reflector, by which the ionized and accelerated molecules are deflected, said reflector being a one piece reflector body with a radially symmetrical trough; and

a detector, which is hit by the ionized and deflected molecules at the end of the path traveled.

6. A time-of-flight mass spectrometer in accordance with claim 5, wherein the ion source comprises a resonance enhanced multi photon ionization (REMPI) source.

7. A time-of-flight mass spectrometer in accordance with claim 5, wherein said detector comprises a multi-channel plate.

5 8. A time-of-flight mass spectrometer in accordance with claim 5, wherein said detector is formed of one of stainless steel or a suitable carrier with a conductive coating and an inner side of said trough is polished.

9. A time-of-flight mass spectrometer in accordance with claim 5, wherein a diameter of said reflector, measured at an edge of said trough, is between 60 mm and 75 mm.

10 10. A time-of-flight mass spectrometer, comprising:
a housing with a gas inlet into which molecules of a gas to be analyzed enter said housing;

an ion source directed at the path of the gas to be analyzed for ionizing the molecules present in the housing;

15 an annular electrode to which a certain voltage potential is applied, said annular electrode accelerating ionized molecules along a path;

a reflector deflecting ionized and accelerated molecules, said reflector being a one piece reflector body with a radially symmetrical trough; and

a detector at an end of the path, said detector being hit by the ionized and deflected molecules for detecting the arrival of ions.

11. A time-of-flight mass spectrometer in accordance with claim 10, wherein the ion source comprises a resonance enhanced multi photon ionization (REMPI) source.

5 12. A time-of-flight mass spectrometer in accordance with claim 10, wherein said detector comprises a multi-channel plate.

13. A time-of-flight mass spectrometer in accordance with claim 10, wherein said detector is formed of one of stainless steel or a suitable carrier with a conductive coating and an inner side of said trough is polished.

10 14. A time-of-flight mass spectrometer in accordance with claim 10, wherein a diameter of said reflector, measured at an edge of said trough, is between 60 mm and 75 mm.